

REMARKS

Reconsideration of the present application is respectfully requested.

Applicants have amended claims 26, 28-34, 37 and 38 and added new claims 52 and 53. Being filed concurrently with this Response is an Information Disclosure Statement in accordance with 37 CFR 1.97(c)(2).

The rejections under 35 USC §102.

Claims 26-29 and 33-37 were rejected under 35 USC 102(b) as being anticipated by U.S. Patent No. 6,311,549 to Thundat. Applicant respectfully disagrees with these rejections.

Applicant has amended claim 26 to include that the induced movement of the second end of the flexible element between the first and second configurations is at least 30 μm . Support for this amendment can be found in paragraph [0025] of the current application, and further in original claim 46.

It is well settled law that a reference anticipates a claim only if each and every element of the claim can be found in that reference. Claim 26, as amended, includes a second end of the flexible element that is movable at least 30 μm . Thundat does not disclose an apparatus having such a range of movement.

In the rejection of claim 46 in paragraph 5 of the Office Action, it is asserted that Thundat discloses a flexible element in which the distance traversed by the second end of the flexible element is between 30 μm and 650 μm , citing Thundat @ col. 2, lines 25-30 for support of this assertion. Applicant respectfully disagrees with this statement.

The cited statements of Thundat only refer to the length, width, and thickness of a

microcantilever. There is no statement regarding the distance that the end of the microcantilever moves. Further, Applicant is not able to find any other statement within Thundat that discloses movement of his microcantilever in excess of at least 30 μm . Lacking at least this claim element, Thundat anticipates neither claim 46, nor claim 26 as amended.

Lines 58–66 of column 2 of Thundat mention that microcantilevers of the kind conventionally used in scanning force microscopy may be used in the Thundat apparatus. It is our understanding that microcantilevers which are used in scanning force microscopy are silicon based or silica nitride based. Lines 58–66 of column 2 of Thundat also mention that the microcantilevers may be “prepared from various ceramics metals and semiconductor materials by methods well known to those familiar with the fabrication of microelectronic devices...”. A microcantilever which is fabricated from the materials mentioned in Thundat will not be capable of deflecting by 30 μm in a liquid. The reason why the microcantilever will not be capable of this deflection is that it is formed from very stiff material (all of the materials mentioned in Thundat are stiff), and such stiff material is not capable of bending sufficiently to provide the claimed deflection of 30 μm in a liquid.

The independent claims of the present application specify that the 30 μm deflection is achieved in a liquid. Achieving a given microcantilever deflection in a liquid requires significantly more force than achieving that deflection in air. This is because the liquid provides resistance to movement of the microcantilever. In the case of a microcantilever formed from silicon or silica nitride (materials suggested in Thundat), attempting to drive the microcantilever at resonance such that it bends to a deflection of

30 microns in a liquid would quickly lead to structural failure. This is because the natural deflection of a silicon or silica nitride microcantilever at resonance would typically be 2 or 3 orders of magnitude less than 30 μm , and the silicon or silica nitride would not be able to withstand the forces required to obtain the 30 μm deflection. Structural failure would also quickly occur in microcantilevers constructed from the other structural materials mentioned in Thundat, i.e. semiconductor materials or ceramic. In this regard the reference to metal in Thundat is not considered to be a suggestion to form the cantilever structure from metal (this would not be considered by those skilled in the art to be practical using microelectronic device fabrication techniques as taught by Thundat).

Thundat lacks all elements of claim 26, and cannot be said to anticipate claim 26. Applicant respectfully requests removal of the rejection of claim 26 and all claims dependent thereon.

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Claims 38-40, 42-45, and 50-51 were rejected under 35 USC 102(b) as being anticipated by U.S. Patent 6,457,360 to Daraktchiev et al.

Applicant has amended claim 38 to include that the second end of a flexible elements moves at least 30 μm between the first and second configurations.

Daraktchiev does not disclose at least this element of amended claim 38. Applicant agrees with the statement in the Office Action in paragraph 5 that Daraktchiev does not disclose movement of the second end and flexible element from 30 μm to 650 μm .

Lacking at least this element, Daraktchiev cannot be said to anticipate claim 38, and Applicant respectfully requests allowance of claim 38 and all claims dependent thereon.

The rejections under 35 USC § 103

Claims 41 and 46-48 were rejected under 35 USC 103(a) as being unpatentable over Daraktchiev with teachings from Thundat.

All of these depend upon claim 38. As discussed above, claim 38 includes claim elements not found in either Daraktchiev or Thundat. Since the combination of references do not include all elements of these claims, a *prima facie* case of obviousness cannot be established. Applicant respectfully requests removal of the rejection of these claims.

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Claim 32 was rejected under 35 USC 103(a) as being unpatentable over Thundat with teachings from Daraktchiev

Claim 32 depends upon claim 26. As discussed above, claim 26 includes claim elements not found in either Daraktchiev or Thundat. Since the combination of references do not include all elements of this claim, a *prima facie* case of obviousness cannot be established. Applicant respectfully requests removal of the rejection of claim 32.

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Claim 49 was rejected under 35 USC 103(a) as being unpatentable over Daraktchiev with teachings from of Murito Coutinho et al.

Claim 49 depends upon claim 38. As discussed above, claim 38 includes claim elements not found in either Daraktchiev or Thundat. Since the combination of references do not include all elements of this claim, a *prima facie* case of obviousness cannot be established. Applicant respectfully requests removal of the rejection of claim 49.

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Claims 30 and 31 were rejected under 35 USC 103(a) as being unpatentable over Thundat with teachings from of US Patent Application No. 2003/0056574 to Drahm.

All of these depend upon claim 26. As discussed above, claim 26 includes claim elements not found in either Daraktchiev or Thundat. Since the combination of references do not include all elements of these claims, a *prima facie* case of obviousness cannot be established. Applicant respectfully requests removal of the rejection of these claims.

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New Claims.

Applicant has added new claims 52 and 53. Both of these claims depend upon claim 26. Support for claim 52 can be found in claim 46 as originally filed. Claim 52 is allowable at least by being dependent upon allowable independent claim 26.

With regards to claim 53, support for this claim can be found in FIGS. 1, 3, 5, 6, and 7. Claim 53 includes an actuating portion having a second section that is proximate

to the second end of the flexible element. Thundat does not disclose this. Instead, Thundat discloses a device for exciting the cantilever that does not have any section proximate to the free end of microcantilever 3 (col. 6, lines 8-10; col. 3, lines 9-15; and FIG. 1). Thundat's device 4 has only a local affect on his microcantilever.

It is more difficult to achieve a given deflection when a discrete actuation mechanism is used, as compared to a distributed actuation mechanism. For example, when a external piezoelectric crystal is used (as shown in figure 1 of Thundat), the microcantilever will not deform along its long axis but will instead only deform significantly at a location adjacent to the piezoelectric crystal. This provides only a small degree of bending, and thus only a small degree of deflection of the microcantilever.

Lacking at least this element, Thundat cannot be said to anticipate claim 53, and Applicant respectfully requests allowance of this claim.

CLOSING

Applicants have amended claims 26, 28-34, 37 and 38 and added new claims 52 and 53.

It should be understood that the above remarks are not intended to provide an exhaustive basis for patentability or concede any basis for rejections or objections in the Office Action. For those rejections based upon a combination of references and/or modification of references, there is no admission that the cited combinations are legally permitted, properly motivated, operable, or modifiable. Further, with regards to the various statements made in the Office Action concerning any prior art, the teachings of any prior art are to be interpreted under the law. Applicants make no admissions as to any prior art. The remarks herein are provided simply to overcome the rejections and objections made in the Office Action in an expedient fashion.

The undersigned welcomes a telephonic interview with the Examiner if the Examiner believes that such an interview would facilitate resolution of any outstanding issues.

Respectfully submitted,

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